GARDEN AND FOREST.

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The Spring Garden.

THIS is the season for the appearance in the newspapers of the annual pleasantries about spring poetry and spring poets; but, although the jest has grown stale and flavorless by repetition, it is the outgrowth of a substantial truth. If the love of nature exists in any one, even as a feeble sentiment, it is always stirred by the miracle of renewed life which is seen in the swelling buds and in the sender green of the springing grass. No flowers make so strong an appeal to the imagination as those of early spring. After the long trance of winter they bring with them the freshness of a new creation and the promise of abundant life. Only a plant with a sturdy spirit could brave the wild weather of a northern March, and yet some of our earliest flowers have a fragile grace which elicits our warmest sympathy as they open trustfully above the frozen earth. Nor do they lack a beauty which would compel admiration at other seasons when the field is full of rivals. In all the floral wealth of summer and autumn there is nothing to excel in delicate beauty the "vestal white and vernal green" of the Snowdrop; there is no blue more pure than that of the Siberian Squill or the Alpine Anemone, while the Tulip rivals in the splendor of its color the most gorgeous flowers of the tropics. We make no apology, therefore, for again urging every one to have a spring garden, for, if one has a garden at all, spring is the season when it can be made to yield the greatest delight. This advice can be given with special emphasis to that large class who leave their homes in summer, and can only enjoy their gardens in April and May and June. Perhaps it should be added that a spring garden can be cared for with less trouble than other gardens, since all the plants which flower now prepare to bloom the year before, and many of them will live on and multiply for successive years without renewal. This last consideration, however, amounts to little, for no one deserves a garden at any season who is not willing to give it all the attention it needs.

We have spoken of the spring garden as if the phrase presented a single definite picture to the mind's eye. But such gardens need not be confined to any one type and may be of infinite variety in structure and material. All the temperate countries of the world and the lofty mountains of warmer latitudes have been ransacked by collectors for hardy plants, so that it is more difficult to decide which ones to reject than which ones to choose. In one of the early volumes of Garden and Forest (see vol. ii., p. 277), a garden was described which consisted essentially of a moderate-sized lawn sloping toward the south and east, and of a somewhat circular outline, in the midst of which stood two noble Hemlocks, whose branches swept the sod. The lawn was surrounded with an irregular shrub border, which was backed by larger trees. Spring-flowering shrubs, like the Spiræas, Exochordas and Forsythias, were backed by taller ones, like the Dwarf Apples and Lilacs, with isolated masses of Daphnes, Andromedas, Azaleas and other dwarf-flowering shrubs to the front of these, while the spaces between these masses were planted with hardy bulbous and perennial plants which bloom in the early spring. This idea of a lawn bordered with flowering shrubs could be modified and multiplied to any extent, and few better situations for such plants as Daffodils and Squills, Iceland Poppies and Columbines, Lady's Slipper, Blood Root and Trillium, in short, for all early-blossoming plants, except those which have been developed by long cultivation into stiffness and formality, like the double Hyacinths, for example. Of course, the arrangement should always be simple and quiet, and its expression would be marred by any glare of color like that produced by large masses of garden Tulips.

This sheltered and flower-fringed lawn, however, is only one type of a spring garden. Many of these early flowers adapt themselves even to formal designs. Many more are well placed against house-foundations or under the lee of walls and fences, where they not only appear to excellent advantage, but where they receive some shelter from the winds and catch the first increasing warmth of the sun. Many others never appear more beautiful or happy than in the crevices or pockets of a well-constructed rock-garden. There are species and varieties for every situation, and so numerous are they that a mere catalogue of their names would cover many pages. We could have a succession of Irises from early March until the Spanish and English Irises burst into bloom. Before the Crocuses are gone the Daffodils will begin to open, and will continue for at least six weeks. Chionodoxas and Grape Hyacinths, Snowflakes and Fritillaries, Orinthogalums, Alliums, Dog-tooth Violets, Lilies-of-the-valley and the Tulip species are among the bulbous plants which have well-known representatives in almost every garden now, yet nearly every genus has newer and rarer forms enough to furnish study and delight year after year to the enthusiastic specialist. Besides these bulbous plants there are a thousand herbaceous ones, many of them natives of our own country, whose very names, if we had space for them, are full of music and spring poetry.

These spring flowers never tire us, be they ever so abundant. Fortunately, therefore, some of them can break over the boundaries of any orderly garden and give us increased delight as they run wild through the grass. Crocuses are never more at home than on a lawn, and they are done blooming before the grass is long enough to hide them. Chionodoxas and Grape Hyacinths multiply like weeds. Lilies-of-the-valley are never more attractive than they are along a woodland walk. The wild Hyacinth, Scylla campanulata, and the Poet's Narcissus will thrive in the tall grass and give an added beauty to any meadow-scene. Any of these can be used to brighten up out-of-the-way corners, and they never serve a better purpose than when they surprise the visitor in the more remote and rougher parts of gardens and large grounds. The illustration on page 145 shows a mass of Poet's Narcissus along a shady walk on the grounds of Mr. John L. Gardiner, in Brookline, Massachusetts, as seen from one of the windows of his house. Perhaps it should be added that the spring garden alluded to above is a part of the same grounds, but, in spite of the wealth of early flowers which it contains, no one would complain that the

outside masses of Narcissus like those shown in the picture, or the same plants growing elsewhere in the grass, are wearisome by their sameness. Certainly the naturalization of these Narcissi and other hardy bulbous plants in meadow grass is one form of spring gardening which should not be neglected by any one who wishes to obtain all the pleasure possible from early flowers. Of course, to have them at their best, the soil must be deep and rich and the grass must not be cut until the leaves of the plants show, by beginning to turn brown, that they have finished their work and that their bulbs have stored up material to produce flowers the following spring.

March in the Pines.

A FEW of the more tender plants made a rapid growth in the Pines during the warm days of early March. Helonias bullata sent up its flower-scape with apparent haste wherever the warm sun could reach it, but amid the dense Cedars it has made but little progress, and therefore the severe frost which suddenly followed three weeks of constant April or May weather did it no harm. The Golden-club, Orontium aquaticum, also made a start, but it was cut down wherever it appeared above the water. Pyxidanthera and the trailing Arbutus are both sturdy enough to defy freezing weather, and the flowers of Andromeda calyculata look as fresh and bright as if the thermometer had not dropped below the frost-mark.

The staminate flowers of the Alder and Filbert had done their work in the warm days and had generally fallen, and the fruit was forming when the cold came. The fruit of the Maple, too, had formed on many of the trees. The Elms also were shedding their blossoms, and the long staminate flowers of the Poplars were strewn thickly over the ground. Some of the Tupelos were showing their blossoms, and so was the Sweet Gum, or Liquidamber. The twigs of the red-bud Cercis Canadensis were studded with bright blossoms which stood the frost bravely.

All through March some of the low Sedges were full of bloom, and its wealth of bright yellow pollen made a feast for swarms of small bees. These bees, together with our hive bees, also collected pollen from the blossoms of the Willows during the warm weather and gathered honey from many of the garden-flowers.

The hardy Winter Cress, Barbarea, blossomed throughout the month, showing a profusion of yellow flowers on stems from two to three feet in height. It is only a few years since I first noticed the advent of this hardy cosmopolitan in our neighborhood, and now it is quite common in many places. It is interesting to keep in view the various foreign plants that are constantly invading our grounds, and to note the disappearance of so many of our native ones. It is only a little more than thirty years since the first clearing was made here in the virgin Pines, where now the large Vineland tract extends over many miles of cultivated ground.

In spite of former experience, one cannot help a feeling of surprise at the intensity of the cold which the hardy spring flowers of the garden will endure. Three mornings in succession Hyacinths were frozen solid, and their great bunches of flowers lay prone on the ground, but before night they had so far recovered as to carry themselves erect and defiant. Several forms of the yellow Narcissus also recovered without permanent injury, as well as many of the smaller plants, like Grape Hyacinths, Chionodoxas, Periwinkle, both white and blue, and purple Violets.

The tender-looking stem of the Crown Imperial stood about eighteen inches in height, with its whorls of buds just ready to expand. The leaves and buds were limp each frosty morning, but to-day it stands erect and fresh, and will soon be in bloom.

Some of the Plum-trees were in full bloom, and the blossoms of Abundance and Botan were hopelessly ruined for this year in my garden. But some of the other Japan Plums, Ogon, Kelsey and Satsuma, were not yet in flower. Some of the Peach-trees were also in bloom, as well as Apricot and Almond trees.

The beautiful Japanese climber, Akebia quinata, was badly injured. The flowers were nearly ready to open, and they now hang limp and black all over the vine. The tender leaves, too, are blackened.

Vineland, N. J. *Mary Treat.*

The Linnæa: An International Botanic Garden in the Alps of Switzerland.

IN the spring of 1889, the Committee of the Society for the Protection of Wild Plants in Europe purchased some land in the high Alps of the Canton Valais, Switzerland, with the view of making it, so far as possible, a botanic garden which should represent alpine species from all parts of the world. This land is close to the village of Bourg-St. Pierre, and near to the Hospice du Grand St. Bernard, in the heart of the Pennine Alps, at an elevation of 1,690 metres. It is easily accessible by a five hours' carriage drive from the station of Martigny, and two hours from the Hospice du Grand St. Bernard. A good hotel is to be found at Bourg-St. Pierre.

The land comprising the garden consists of a mountainous cone, one hectare in extent and about seventy metres higher than the adjacent country. This cone forms a natural and picturesque "Alpe," surrounded on three sides by the roads leading to the Hospice, and on the fourth by a dark precipice of more than one hundred metres depth, through which rushes the picturesque and impetuous torrent of Valsoray, with a beautiful cascade sending its mist to the summit of the cone. The garden is very uneven, strewn with rocks, dotted here and there with Larches, and contains in one portion a grove of these trees. It is composed of a dozen upland plateaus forming natural terraces. At the top of the "Linnæa" stood, in feudal times, a fortress belonging to an old Italian family. No trace of this castle remains at present.

The society which owns this beautiful natural garden embraces among its members some well-known scientists and literary men of Europe, among them Sir John Lubbock, Professor Romanes, of Oxford, and Monsieur H. de Vilmorin. The name "Linnæa" was given in honor, not only of Linné, but also of the Linnæan Society of London, and the pretty little Linnæa borealis which grows wild near by. The mountain cone is well exposed to the sun upon all sides, thus favoring a great variety of alpine plants, some of which find a natural home in the shaded and moist nooks in which the garden abounds.

Each of the natural uplands is devoted to a particular flora, of which those of the Pyrenees and the Caucasus are of especial interest. A complete set of Pyrenees alpine plants is represented. Among these the Androsaceæ and the Saxifrages are the most beautiful. From the Caucasus was received three years ago quite a collection of seeds, brought by Messieurs Levier and Sommier, of Florence. Some of these were obtained from plants which were not in flower, whose identity, therefore, could not be ascertained at the time. Two of them, Androsace Caucasica, L. & S., and Scabiosa Correvoniana, L. & S., proved to be new.

One plateau is devoted to Siberian plants, another to Himalayan, one to Rocky Mountain species, another to Andean, while one is for New Zealand plants, and so on. A short time ago the director started a plot of alpine species with albino flowers, which are now doing well.

Those having the garden in charge hope to found there an "Ecole de Botanique" on a large upland, on which will be planted and scientifically arranged all the mountainous plants of the world, as far as possible! It is proposed to make a careful study and comparison of the origin and growth of alpine species and the relations which exist between them, the behavior of insects toward them, the variation and acclimatization of species, together with other important problems. As every one knows, it is a difficult matter to study these questions at high altitudes and in the

wild nature of the Alps. In the "Linnæa" almost unparalleled opportunity will exist for such work.

The director extends a cordial invitation to all Americans traveling abroad to visit the garden. He desires also to receive seeds of alpine plants from all parts of North America. It is to be hoped that the responses to this request will be many and prompt. Such seeds may be sent to the director of the garden. H. Correvon, 2 Plainpalais, Geneva, Switzerland.

Washington, D. C. *G. H. Hicks.*

Foreign Correspondence.

London Letter.

Japanese Trees and Shrubs formed the subject of a lecture by Mr. J. H. Veitch at the last meeting of the Royal Horticultural Society. A large number of Fellows attended, and Mr. Veitch's discourse, illustrated by means of numerous dried specimens and living plants, was full of interest. He expressed his indebtedness to Professor Sargent, who was his traveling companion in Japan during a portion of his stay there, and whose knowledge of the flora was of great advantage to him. The matter of the discourse was, in the main, similar to that of the series of articles on Japanese plants, recently published in Garden and Forest. Mr. Veitch collected plants and seeds of many plants which he believes will be accepted as good garden-plants in England when their merits become known. The number of first-rate ornamental trees and shrubs that we owe to Japan is already very considerable, and fresh additions are being made every year, some of them being, of course, only re-introduced, but others are quite new to cultivation.

Prunus Pissardi is beautiful at Kew now (the middle of March), and it bids fair to become at least as popular as the Almond and double Peach, which are also wreathed in flower with us at this time. The Prunus was first recommended as a garden-tree chiefly, I believe, on account of the coppery-red color of its foliage, a character which gives it considerable value when used judiciously. But this character is eclipsed by the flower-beauty of the trees in spring, when the branches are heavily laden with medium-sized pale pink flowers, among which the unfolding brown-red leaves have a most harmonious effect. English nurserymen, seeing that it is sure to be in great demand, are propagating it largely. It owes its garden-name to the fact of its having been introduced into France about fifteen years ago by Monsieur Pissard, gardener to the Shah of Persia, where it is a native. Its proper botanical name is P. cerasifera, var. atropurpurea. Its fruits are red, an inch in diameter and edible.

Almond-trees in Street-gardens.—In the neighborhood of Kew, Almond-trees are a conspicuous feature, occurring in almost every villa-garden, so that the roads are all aglow at this time of year with the beautiful flowers of this fine tree. The extraordinary number of Almond-trees here, is, no doubt, due to an accident, probably some nurseryman, with a big stock of them, having supplied the trees for the gardens when they were first planted some fifteen or twenty years ago. He was a public benefactor, anyhow, whether by accident or design, the Almond-trees giving the locality a delightful character, almost, if not quite, unique. I refer to it here because it teaches a useful lesson, namely, that effective trees which prove themselves suited to a locality should be planted abundantly in preference to that endless variety which often confuses and rarely is effective. Kew might be called Almond Grove at this time of year.

Columellia oblonga is an interesting and pretty little shrub which is grown in a cool greenhouse at Kew, where it is now in flower. According to Sir Joseph Hooker, it is common at high elevations (13,000 feet) above Quito, where it forms a small tree, with whitish branchlets covered with opposite, tongue-shaped, crenately toothed leaves about an inch long, and terminated by compact clusters of yellow, fleshy, Primrose-like flowers three-quarters of an inch across. At Kew the plants are small, barely a foot high, yet they are flowering freely. This and another species, also Andean, constitute the natural order Columelliaceæ, which is now placed between Pinguicula and Gesneraceæ, but which is so anomalous that Don gave the Jasmines as its nearest affinity, Lindley Vaccinieæ, and Hooker Loganiaceæ. The corolla is formed of a short broad tube and five orbicular spreading lobes; there are two large short stamens and a short two-lobed style.

Digitalis Canariensis is the garden name for a plant now rarely seen, but which was cultivated in England nearly two hundred years ago, and was figured by Lindley in the first volume of his *Botanical Register*, t. 48. I would advise any one who wants to make the acquaintance of a striking and beautiful flowering shrub to turn to Lindley's picture of it, and then to write to some one in the Canary Islands for plants or seeds. It is cultivated at Kew, and I saw a plant of it last year in the Glasnevin Botanic Garden. It forms an upright shrub ultimately about six feet high, with stout woody branches bearing only a few leaves at the ends, and these are from six inches to a foot long, linear lanceolate and fleshy. The flowers are borne in crowded terminal erect spikes a foot long, each flower being tubular, an inch long, fleshy, and colored bright orange-yellow. It requires protection from frost. The proper name for this plant now is Isoplexis Canariensis.

Tulipa Kaufmannii is a rare and beautiful species of which flowers were exhibited at a recent meeting of the Royal Horticultural Society by Mr. Lynch, curator of the Cambridge Botanic Garden, where this plant has been exceptionally effective in the open border in the early part of March. It has flowers as large as a large form of T. Gesneriana, measuring, when wide open, seven inches in diameter; its color is creamy yellow, changing to white after it has been open three or four days. The unopened buds are prettily marked with a broad central line of red and bluish feathering on the back of the petals. It is a distinct and evidently free-growing species. I observe the Dutch bulb-growers offer bulbs of it. For its introduction we are indebted to Dr. A. Regel, who found it in Turkestan in 1877. Mr. Baker says it is as variable in color as T. Gesneriana, ranging through various shades of red and yellow to white.

Fritillaria aurea is a pretty little species which may be grown in pots for the conservatory in spring or planted out in the open border. It is allied to F. latifolia and F. aurea; indeed, it was at first considered identical with the latter by Mr. Baker. It has been in cultivation since 1876, when it was introduced from Cilicia. It has lately been sent again in quantity by Mr. E. Whittall from Smyrna, and the flowers of these Smyrnian plants are nearly as large again as those from the Taurus, as described by Mr. Baker and figured in *The Garden* two years ago. There are a few pots of Mr. Whittall's plants in the alpine-house at Kew, five-inch pots containing half a dozen bulbs. From each of the bulbs springs an erect stem six inches high, clothed with narrow lanceolate, glaucous-green leaves two or three inches long, and bearing a cernuous flower which is campanulate, one and a half inches across the mouth; the segments oblong obtuse, nearly an inch long, and the color bright canary-yellow, copiously freckled with small brown-purple dots.

Two New Orchids.—Messrs. F. Sander & Co. have recently introduced from New Guinea a new Grammatophyllum and a Dendrobium, plants of which were offered at an auction sale a few weeks ago. They are described by Professor Kranzlin in the *Gartenflora* for March 1st as follows: Grammatophyllum Guilelmi II.: habit of G. Fenzlianum, but larger, with massive stems and leaves two feet long by four inches in width. Raceme about three feet long, bearing from twenty to thirty-five handsome flowers, each over three inches in diameter and colored purplish-brown margined with greenish-yellow, the lip white with purple stripes. Dendrobium Augustæ Victoriæ: a large-growing species in the way of D. Mirbelianum, bearing, at the apex

of stout pseudo-bulbs, racemes a foot and a half long, clothed with numerous handsome flowers, each over an inch in diameter; sepals white, petals pale yellow, with purplish markings and the lips rose-purple. The descriptions look promising, but we cannot compliment Herr Kranzlin on the choice of specific names, which are too cumbrous.

An experimental fruit-farm is about to be formed near Woburn, in Bedfordshire, by the Duke of Bedford, who takes a special interest in all questions affecting the fruit supply of this country. It is in contemplation to form at first a model orchard, in order to investigate, both scientifically and practically, the culture of hardy fruits. About twenty acres of land in the neighborhood of Woburn Abbey have been set apart for the purpose, and are to be placed under the superintendence of Mr. Iggulden, a good horticulturist, who has been for many years gardener to the Earl of Cork and Orrery at Marston House, Frome, Somerset, and who is well known as an able writer on practical fruit-culture and other horticultural matters. The Duke of Bedford is setting an example which county councils here might well follow: To teach the uninitiated what to grow and how to grow it. A few model orchards or gardens, such as is here proposed, would be infinitely more successful than lectures in school-rooms with blackboard illustrations. Gardening requires to be seen in operation and assisted at before it can be understood.

London. *W. Watson.*

Cultural Department.

Early-flowering Magnolias.

FEW shrubs or small trees attract so much attention when in blossom as do the early-flowering Magnolias, the flower-buds of which open before the leaves expand. These flower-buds are fully formed during the previous summer, are large and conspicuous during the winter and are densely covered with thick strong hairs or pubescence; while the later-flowering species have much smaller buds and the hairy covering often appears much less developed, or it may be entirely wanting. All of the early-flowering Magnolias known in our gardens have been received from Japan or China, the Magnolias native to our eastern North America all belonging to the class which flowers after the leaves have expanded, as do also a number of species indigenous in eastern Asia.

There are only four recognized species of the early-flowering group in cultivation, but from these there have been produced a number of hybrids or varieties which have received latinized names. Magnolia conspicua and M. obovata are the best known of the four species, and forms derived from these are most common in gardens.

Magnolia conspicua, or M. Yulan, as it is sometimes called, is a most beautiful species when covered with its large lily-like pure white blossoms. It is perfectly hardy in Massachusetts, and in Boston and vicinity it is usually in full bloom about the first week of May, but varying according to the season and location. In 1888 a few of its flowers were open on May 8th; in 1889 on April 23d; it was in full bloom May 1st, 1890; the same plant was equally advanced April 25th, 1891, and on May 2d, 1892. Trees of this species are uncommon about Boston. A specimen on Beacon Street, although not large, always attracts much attention when in full flower, and in the shelter of the city buildings it may blossom a little earlier than the dates given. In this climate Magnolia conspicua may become a symmetrical little tree twenty-five feet or more in height. The plants purchased from nurserymen are almost invariably grafted, and they will begin to blossom when three or four feet high, and the bloom will increase with the age of the plant.

Magnolia obovata is a species closely allied to and used to hybridize with M. conspicua, but the aboriginal form is a very rare plant in our gardens, and is not considered very hardy. It is hardly more than a large shrub, having large flowers, which are of a deep purple color on the outside and creamy-white within. In cultivation it is best represented by the plant known as M. Lenné, which resembles it very closely in many respects and which is supposed to be a hybrid between M. obovata and M. conspicua. M. Lenné is quite hardy in this climate and becomes a large broadly spreading bush. It does not always flower so profusely as M. conspicua or as some of the other hybrids which are better known. Of these latter M. Soulangeana is probably the most familiar in American gardens. It has much the same habit of growth as M. conspicua, but has somewhat smaller white flowers, and these are tinted or streaked with purple on the outside, especially near the base. Besides this, there are several other very similar forms with purple-tinted flowers, which have received specific names from nurserymen, and which are often not to be distinguished from M. Soulangeana in general aspect. Where only one plant of this type can be afforded, M. Soulangeana should be selected. The others may be added if all slight variations are desired. These pass under the names of M. speciosa, M. Norbertiana, M. superba, M. stricta, M. Alexandrina, M. Candolleana, etc.

All of these hybrids, being propagated by grafting, begin to flower when quite young, and the blossoms open some days later than those of M. conspicua.

These Magnolias have a strong and peculiar odor, not really disagreeable, yet not wholly agreeable, to most persons. In another early-flowering species, however, the flowers have a sweet fragrance which most people like. This is Magnolia stellata, sometimes called M. Halleana, which, although usually seen as a low and spreading shrub, may attain to a height of ten feet or more. It is still rare in American gardens, but is fast becoming better known. Its flowers are pure white, about three inches in diameter, and they appear earlier than those of any other species if planted in a warm situation. It is a most attractive plant when in full bloom, and it possesses the merit of beginning to bear a few flowers when only a foot or two high. It will grow in any good soil, and may be planted with good effect in a well-made rockery.

The fourth species of early-flowering Magnolia in cultivation is M. Kobus, known also as M. Thurberi. It promises to become a good-sized tree, and as yet it has shown little inclination to flower freely. Its blossoms are pure white and quite fragrant, and if the tree blooms freely when of mature age it must prove very handsome. It is perfectly hardy in this climate, and, although still very rare, it is likely to soon find places in many gardens.

Most of the early-flowering Magnolias sold by nurserymen are grafted plants, and in this country they are usually grafted on the Umbrella-tree, M. tripetala, or upon stock of the Cucumber-tree, M. acuminata, and the latter is generally to be preferred. They will thrive in any good soil, provided it is well drained, but not too dry. A peaty soil seems particularly suited to them. They should be transplanted in spring, and it is safest not to do this too early, but to wait until the buds burst. If planted too early the very fleshy roots of all Magnolias which have been cut or bruised are likely to be affected by decay, but if moved when growth has started, healing of the wounded parts begins at once, and there is less danger of injurious effects.

Arnold Arboretum. *J. G. Jack.*

Some Points in Pruning Fruit-trees.

I HAVE often observed that when farmers and others who have set out fruit-trees are asked why they have neglected to prune them, the reply is that they do not know rightly how to prune, and they fear, in cutting off branches, that they may do more harm than good. Sometimes this excuse is really one of laziness or indifference, but more commonly it is true. It is a puzzling thing to thin out the head of a neglected fruit-tree, even to a man of experience; and, as a matter of fact, few men, if any, however large their experience, will entirely agree as to what shall be cut and what left.

There is a conservative surgery of the orchard, and skillful work will be justified in its results, when compared with mere cutting and slashing. To begin with the young tree from the nursery, two or three years old, it must first be understood that perfect spacing of limbs at that age is out of the question. The young trees must be allowed to grow awhile before much can be done toward fixing the frame-work of the tree. A young tree of four feet in height does not afford the room, when the proper allowance of bare trunk is made, for final limb-spacing. The top of such a tree is too low to allow for the height of even the lowest limb of the bearing orchard-tree, which should not be lower than five feet. Yet it is right that the lower limbs of the tree should be left to grow until the tree is so well established as to make an annual growth on leading limbs of one to two feet. When the tree is thus well under way we may begin carefully to rub out buds and select the position of limbs, holding always in mind that the ultimate spacing cannot be established for several years, because the required space does not yet exist. This early pruning is provisional, and more or less temporary; but the future tree must be in the mind's eye from the start.

If the soil is in good condition, and the young trees healthy and well rooted, there will always be something to do in rubbing out buds and removing superfluous shoots; but it is best not to do too much in this way at any single inspection. Each tree of a vigorous young orchard should be gone over every week or ten days, only the obviously necessary cutting being done at one time; and it is plain that the visits to each tree should be frequent enough to prevent waste of plant-energy in useless growth. These frequent visits are also essential to prevent damage from successive broods of insects. The risk of severe shock to a young tree by too much cutting at one time, causing arrest of growth, and consequent tendency toward scrubbiness, should be always kept in mind. It is a good point, also, to study each tree while visiting it with a view to future removals of wood. A limb to be soon taken out may, by pinching out its tip, be prevented from further growth; but if such a pinched limb is left more than a week or two, it will push many of its lateral buds, and, therefore, the interval between pinching and removal must not be long.

The trees of a young orchard are subject to injury by high winds, and after severe storms the orchard ought to be gone through rapidly by two persons, and such trees straightened up and firmed in the ground by careful treading, such as will not injure the bark. A tamping-stick, somewhat flattened on one side of the lower end, is useful in such work. If a racked tree cannot otherwise be completely straightened up, so as to

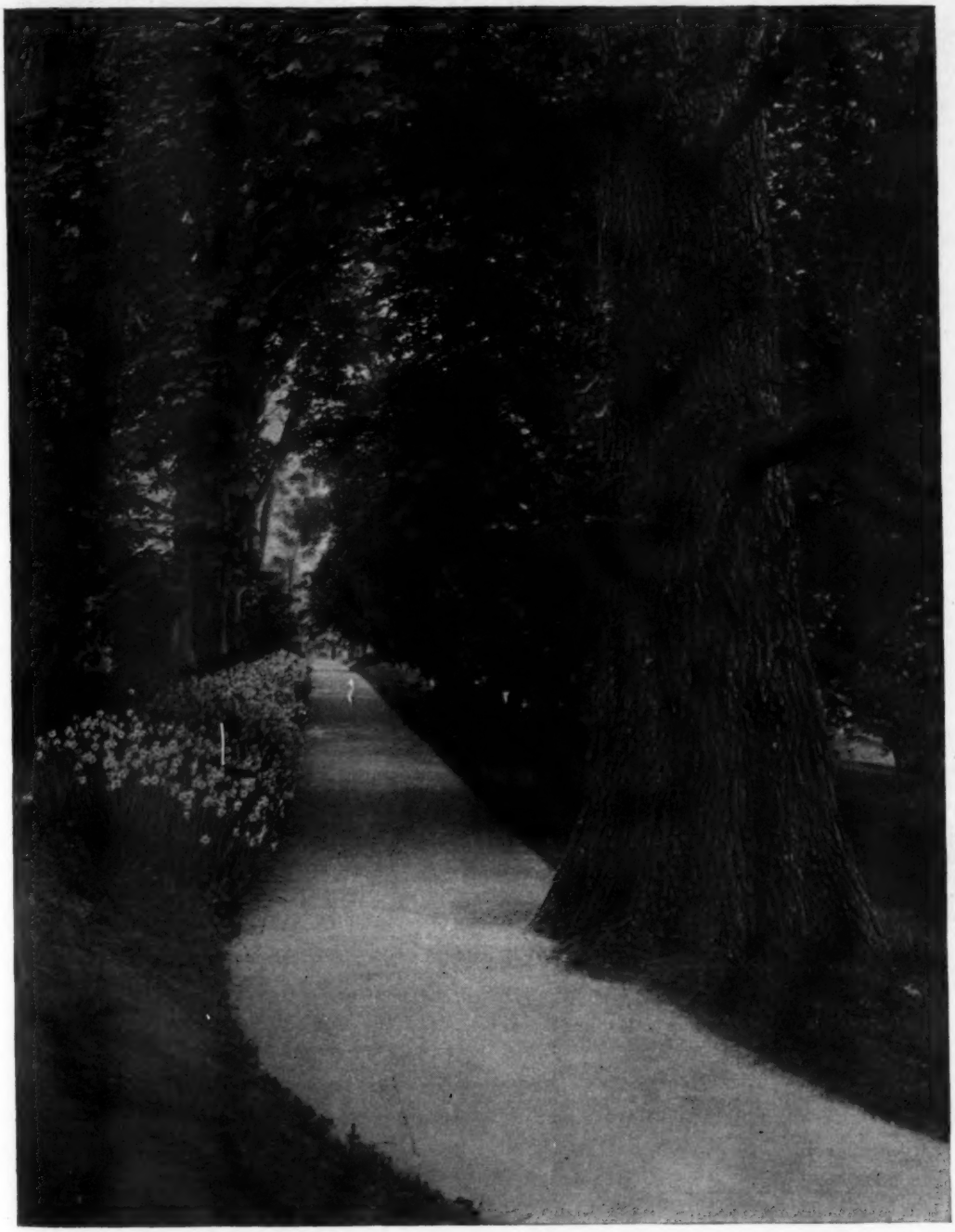

Fig. 26.—A Garden Walk in Early Spring.—See page 141.

stand firmly erect, it should be well staked; for otherwise all the branches may take on a "set," which would require much careful work to remedy.

When a rather slow-growing variety has been worked on a vigorous root there is usually more or less tendency shown on the part of the young tree to send up suckers. All such cases ought to be treated thoroughly, by removing the earth about the tree so as to expose the point of origin of every sucker. Remove each one with a sharp knife, going deeply enough so that there will be no more sprouting from those points; it is well at the same time to notice wherever any little white points are forming upon the stock, indicative of further sprouting, and to devitalize them by a slight cutting. If this is not done thoroughly from the start the evil will rapidly increase, to the great detriment of the orchard. This is in some degree prevented by such deep planting as will allow every young tree to root freely from the cion.

Newport, Vt. *T. H. Hoskins.*

The Hardy Flower-garden.

CHIONODOXAS are still in flower, though the earliest blooms are past. C. Alleni, in its second year, is proving a gain. It is quite the largest-flowering variety of the family, exceeding even C. grandiflorum, than which it also seems more free-flowering. The slaty blue color of C. Alleni is not unlike that of C. grandiflorum, perhaps a trifle brighter. These Chionodoxas have often a tendency to show a large eye at the base of the petals. I grew a pan of C. Alleni in a cool-house last year and these all showed this tendency very markedly, the color being refined to a nearly pure white at the base of the petals, while the blue of the upper part of the petal was purer in tone than in those grown in the open. I thought at the time, making allowance for lighter color under glass, that the variety would prove a large white-eyed C. Sardensis, but was mistaken. C. Alleni has the same dark-colored line down the centre of the petal which distinguishes C. grandiflorum. It is evidently the fate of these two varieties to be mingled in gardens. C. Tmolusi will probably also join C. Luciliæ, where effects and not differences are valued. The former variety with me is of more intense blue than C. Luciliæ, and has a smaller white eye. The petals are also not so much reflexed. Mr. Whittall sent out a "C. Sardensis with dark eye" this year. It is a beautiful flower, richly colored and, perhaps, earlier than the type, though this is not certain. I am unable, however, to see any change from the normal type in the eye, which, in both cases, is a mere cluster of white stamens, the petals being entirely dark blue. Red and white forms of Chionodoxas continue very rare. We have, thanks to Mr. Whittall, this year, the first red forms of C. grandiflorum, but the bulbs are not yet strong. Red or pink forms of C. Luciliæ are very pretty, but the pure white kinds are the choicest of the family. Still, if one does not care for rare flowers he may well be content with the original Glory of the Snow, for C. Luciliæ is one of the brightest and most distinct of garden-flowers at this season, and well planted will wax strong and increase in numbers and consequent beauty each succeeding year.

There may be a calendar of Daffodil flowering, but it seems to vary much from season to season. This year Bicolors and Henry Irving were easily first, followed by Tenby, Scoticus, Ard Righ, Nanus, Countess of Annesley, Golden Spur, Sir Watkin and King Umberto. As the latter is a selection from the first variety, this list is an instance of the folly of trying to make out the rotation of varieties which flower at about the same time. Like all bulbs in the open, their flowering time is modified by circumstances, such as soil, exposure and depth of planting, and either of these may vary but slightly to produce very marked variations.

Elizabeth, N. J. *J. N. Gerard.*

Sub-irrigation in Greenhouse and Garden.

JUST at present the new method of watering greenhouse-beds by means of pipes or lines of tile laid on the bottom of water-tight benches, is a much-discussed and interesting subject. While experiments in this line have only just begun, and the solution of most of these irrigation problems is yet a task for the future, we can already see that the innovation for greenhouse operations is one of practical value. As in almost all such cases, however, the first claims of its inventors, or advocates, will need modification. One of my benches has been arranged for subirrigation by means of a five-quarter-inch gas-pipe laid on the ordinary plank bottom in the manner shown in accompanying sketches (see figures on this page). The two parallel pipe lines are two feet apart. Quarter-inch holes are drilled through the pipe four or five inches apart, alternately on opposite sides. The further end is closed, although not perfectly tight; the other end is turned up and receives the water through a funnel, or directly from the hose. The bench bottom is not absolutely water-tight, being made of ordinary matched two-inch pine-plank. Neither lead, cement, nor paint has been used. This has saved work, time and expense, and the arrangement seems to work well.

I find the following advantages in the new method of water-application: (1) Ease of application; (2) certainty of thoroughness in watering; (3) exemption of plants from disease. Overhead watering in amateur houses, when it has to be done by

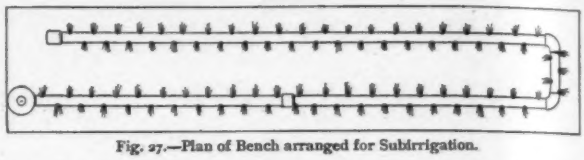

Fig. 27.—Plan of Bench arranged for Subirrigation.

means of the ordinary garden-sprinkler, is a tedious task. In the new arrangement we simply pour a few bucketfuls of water into the funnel and the work is not only done, but done well. This method of application also enables us to use washing suds, manure-water and similar liquids which we would not like to put on the plants from overhead, either from considerations of cleanliness or for fear of clogging the sprinkler.

Watering beds with the sprinkler is rarely done thoroughly. A bucketful of water sprinkled on in the usual fashion will make a good-sized bed appear soaked, while, in fact, the application may not have reached beyond an inch deep, leaving the lower portions dust-dry. Such, indeed, is not an uncommon condition of many benches and flats in the glass-houses of amateurs. Subirrigation gives us reversed conditions. On a bench, which one bucketful of water applied by surface-sprinkling would render apparently quite wet, you may turn two or three bucketfuls through underground pipes, without bringing moisture enough for a respectable show to the surface. The consequence is that almost every one, without exception, would apply a greater quantity of water by subirrigation than by the old overhead sprinkling method. Herein, I believe, is the chief and, perhaps, the only reason for the greatly increased growth of certain crops observed at the Ohio Station, as the result of subirrigation. It is only an experience similar to the one made in the application of fertilizing substances on Potatoes and other crops. Quantity of application is the deciding factor rather than the mode of application. Lettuce and Onions are especially subject to this influence. On an ordinary bench, and in nicely prepared, porous soil, I can produce almost double the growth of these vegetables in a given time by doubling the ordinary overhead applications of water. It is surprising what large quantities of water Lettuce will take and delight in. Amateurs seldom give it enough for best effect. With a subirrigation arrangement this will be different. The application does not quickly show on the surface and consequently it is naturally more abundant than under the old method. The roots of the plants are kept well supplied with moisture all the time, and the growth, therefore, is rapid and healthy.

Herein, possibly, may also be found an answer to the question why the Tomatoes at the Ohio Station did not show as

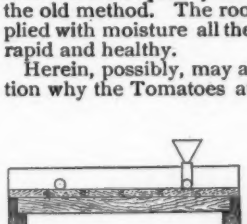

Fig. 28.—Cross-section of Bench.

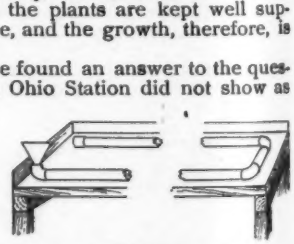

Fig. 29.—Subirrigating Pipe, in perspective.

much difference in favor of subirrigation as the Lettuce did. Tomatoes do not need the large amount of moisture required for rapid growth in Lettuce.

When water is frequently applied by sprinkling on heading Lettuces, rot is liable to attack the central portions of plants, and the lower leaves, resting on the continuously moist surface, will also decay by wet rot. Subirrigation prevents all these troubles. Possibly there may be advantages of the new method not yet mentioned; the future will tell us more about the subject.

Subirrigation in the garden is of no less practical importance. I think it is feasible, at least, on a small scale. What is to prevent the home-gardener from arranging a little plot on the same principle as the greenhouse bench? Of course, in

place of the expensive iron pipe, we will use lines of tile, laid six or eight inches deep, with each line fed from a box at the upper end. Very few experiments in this line have been made, or are thus far reported; but very many should and will be made hereafter. The "new Celery-culture," without some such plan of irrigation, for instance, cannot be expected to give its best, or even sure, results.

La Salle, N. Y. *T. Greiner.*

For Beginners in Vegetable Culture.

I OFFER the following suggestions and list of vegetable seeds for the use of inexperienced gardeners, who want the most possible for the least expenditure of money and labor, or for a boy who is making his first venture in gardening:

Never disturb the ground by plowing, spading, hoeing or tramping on it while it is wet.

See that your garden spot is well enriched by spreading evenly over it, before plowing or spading, a dressing about two inches thick of well-rotted stable-manure at least a year old. If this is unattainable and you must use fresher manure, work it over and make it as fine as possible and then take great care to spread it evenly. If commercial fertilizer is depended upon, spread it evenly, at the rate of six to twelve pounds to the square rod after plowing or spading and before smoothing the ground in preparation for sowing the seed.

General directions as to distance apart and methods of culture can be found on the packets or in the seedsmen's catalogue, but the seeds should be planted about in the order given:

Onion: one packet Yellow Globe Danvers. Radish: one packet Long Brightest Scarlet. Beet: one packet Detroit Dark Red or Crosby's Egyptian. Turnips: one packet Purple-top Strap-leaf. Lettuce: one packet Tilton's White Star or Black-seeded Simpson. Parsnips: one packet Hollow Crown.

The young plants of the vegetables named above are not killed by frost, and may be sown as soon as the ground is dry enough to work.

Peas: one-half pint Premium Gem, one-half pint Advancer. Corn: one packet White Cob Cory, one-half pint Moore's Concord or Country Gentleman. Summer Squash: one packet Mammoth Summer Crookneck. Cucumber: one packet Chicago Pickling or Cool and Crisp. Beans, Bush: one pint Challenge Black Wax or Pink-eye Wax, one pint Speckled Wax. Beans, Pole: one packet Horticultural Lima, if as far north as Boston, or one packet Challenger Lima, if south of that point.

Plant this second selection as early as possible, without endangering the young plants, which are liable to be nipped by frost.

Lettuce: one packet Deacon or New York, for summer use. Muskmelon: one packet Netted Gem, Emerald Gem or Osage. Watermelon: one packet Phinney's Early, if north of Boston, or one of Peerless or Boss, if south. Radish: one packet Chartier, for fall and winter use. Tomatoes: better buy twelve or fifteen plants—Early Michigan, Essex Hybrid or Perfection preferred. If raised from seed this should be sown in the house about April 1st. Cabbage: better buy twenty plants—Winningstadt or All Seasons preferred. If raised from seed sow out-of-doors at the same time as Turnips. Celery: better buy fifty plants each of Golden Self-blanching and Perfection Heartwell. If raised from seed start indoors at the same time as the Tomatoes. Cauliflower: better buy plants of Snowball or Extra Early Erfurt. If raised from seed it should be sown same time as Cabbage.

The last two, although easily grown when one knows how, will be more likely to fail without especial care than any of the others, and will give the smallest return for the skill and labor they require.

The above list of varieties is by no means what I would recommend as the best in quality or for an experienced gardener, but they are all good, and are the sorts most likely to give satisfaction under the conditions supposed.

Detroit, Mich. *Will R. Tracy.*

Frost and Flowers.—After about three weeks of warm growing weather in March the low temperature a fortnight ago brought on a sudden cessation of growth for a few days and nights. In such conditions, with fifteen degrees of frost at night, a garden of plants in flower or in a forward state of growth is naturally a subject of some anxiety. As these cold days were also clear and sunny, there was added another element of danger from too rapid thawing, owing to which tender fibres do not have time to rearrange themselves after the threatened disruption by freezing. Looking over the garden in the early morning after a night temperature of fifteen to eighteen degrees at this season one would find all soft leaves darkened with frost and seemingly lifeless, many flowers drooping, and a rather hopeless picture altogether. Yet, after a careful search in warmer weather, I found no apparent damage from the frost beyond the slight injury to the leaves of one small clump of Tulips and a slight scorching of a leaf or two of Iris orchioides. The latter was in a very sunny eastern location. The Tulips were Gesnerianas, and I have no theory to account for their having been singled out for attention among the numerous varieties in the garden, many of which were more exposed. Without mentioning the earliest plants which one expects to come through such trials unscathed, as a matter of course, the following are a few bulbous plants which passed the ordeal in safety: Calochorti, Brodiæas, Gladioli, Zygadenus, Alstrœmerias (near a wall), Irises in variety, Narcissi (a number in flower), Tecophilea cyanocrocus, Tulips in variety, Alliums, Camassias and Leucojums. As for plants other than bulbous which venture out at this season, one never gives them an anxious thought, provided they have been exposed during the winter. If, like the Poppies, they bow a few hours to the frost, they quickly recover their normal position. But it is always somewhat a matter of surprise that apparently delicate plants and soft juicy foliage prove so indifferent to a sudden chill. The flowers of the season are less injured by frost than by a few hours' rain. I can imagine conditions under which such a garden might be badly wrecked, though these are not likely to occur here. Possibly, with continuous warm rains, with rapid starting of foliage at this season, followed by hard frost, there would be much pulping of leaves. My experience this season simply confirms me in the belief on which I am in the habit of acting. This is to grow thoroughly hardy bulbs without mulch or protection, and let them run their course without endeavor to regulate them. This presupposes, however, that they have been planted at the right time and in the best position.

Elizabeth, N. J. *J. N. G.*

Dendrobium Dalhousianum.—This is one of the most vigorous of all East Indian Dendrobiums, and one of the most easy to grow; it is very free-flowering, too, since flowers are produced from the same stems for several years in succession. Our plants were obtained as newly imported dry plants. We have grown them for two years, and each year a quantity of racemes have appeared from the apparently lifeless stems that were made in India, where they had also flowered. The peculiar fawn-colored flowers have two rich maroon blotches on the lip, which renders them very striking even to any one not interested in Orchids. The plant requires the warmest house when in bloom, and a cooler place for a few weeks when growth is over. It is always late in finishing up the long stems in autumn; our season is never too long for it, and, therefore, the resting period is shorter than with most Dendrobiums. The old stems should never be cut away until they are decayed and useless, for, as long as there is vitality in them, flowers will be produced in spring.

Fritillaria aurea.—Last spring we took occasion to note the value of this early and beautiful spring-flowering bulb, and this, the second spring after planting, further proves its value for the open border, as it is perfectly hardy and needs no coddling. There was a fine colored plate of this Fritillary in the London *Garden* of July 23d, 1892, but the picture failed to do justice to the beautiful way in which the insides of the flowers are checkered with brown. It is also noticeable how the flowers vary, no two being marked alike inside, this probably being due to the fact that the bulbs are fresh from their native locality, the Taurus Mountains, in Cilicia, where it grows in alpine pastures. It is one of the earliest outdoor flowers with us, coming in with the first Narcissus. For its introduction we are indebted to Herr Max Leichtlin.

Double Hardy Violet.—When all indoor Violets are past, and the single and double ones in the frames are about to finish flowering, the value of this variety when grown in frames becomes manifest. It is the darkest blue of all the varieties, is not liable to injury from disease, and is perfectly hardy even here. What the real name of the variety is I am by no means sure. It is known locally as the Cape Cod Violet, and has been sold as the double hardy Russian, but that it is an old variety which has survived its name appears fairly certain. It would be interesting to know what it really is. The only objection to it is that the stems are often very short, especially when grown outdoors, but this is easily overcome when grown in frames by encouraging a free leaf-growth.

South Lancaster, Mass. *E. O. O.*

Garden Peas.—From the number of garden Peas catalogued annually, it is each year more difficult to select from these a good variety or two for home planting. Where quality is the first

consideration, the list dwindles down to a very few, and, in my opinion, the Bliss American Wonder stands at the head. It is the first early, most productive, and needs no bushing, and without doubt, for small gardens, is the one Pea. For later use we plant the Champion of England largely; for quality it has no superior, and it is also a free bearer, its only objection being its height, which is often over six feet; of course, it needs strong support. It is not so liable to mildew as some others at the end of the season, and is, taken altogether, the best middle and late season Pea. Where the height of the last named is an objection, the Yorkshire Hero may be tried as a substitute; the flavor is also good, and the height is not so great as in the last named. These three Peas can be relied upon to give a good supply through the summer if sown at regular intervals, taking care to sow the first row of late Peas at the same time as the last lot of early ones are planted, or there will be an interval of a few days.

South Lancaster, Mass. *E. O. Orpet.*

[It should be added to this that there are some soils in which the American Wonder Pea will fail outright. In places where it has never been tested those who want an early wrinkled Pea of the first quality would do well to make a planting of Alpha along with one of American Wonder.—Ed.]

The Iona Grape.—I should like to speak a word for the Iona Grape to those who are planting a vine or two for home use. It is in so many ways a remarkable fruit, and more people should enjoy it. The only difficulty is that the vine is not quite hardy. I am compelled to cover it here, and to do so carefully, but it well repays this care. The fruit is extremely abundant, and of such a quality as to delight any one who does not wish for more sweetness. It has a winy sparkling flavor that is highly refreshing. The bunches do not always perfectly ripen in this latitude, but if picked apparently half-green the grape has the peculiar faculty of perfecting and ripening in the house. Curiously, also, though very thin-skinned and juicy, the Iona is a splendid keeper. I find it better than Isabella even, and nearly as good as Catawba or Diana. Instead of deteriorating, its flavor improves with keeping. Brighton, from Iona parentage, is much earlier and a hardier grape, but it is not self-pollenizing, nor does it keep at all. It is one of the few excellent grapes that must be used at once. Every householder ought to have an Iona vine in some warm exposure for home use. It is just the grape for one who has a cultivated grape taste.

Clinton, N. Y. *E. P. Powell.*

Correspondence.

Dimensions of Minnesota Pine.

To the Editor of Garden and Forest:

Sir,—The following dimensions of White Pine stumps and tops may be of interest, as they show probably the best development of scattered trees in hardwood that may be expected in Minnesota. One hundred and sixty-seven of these trees scaled 285,870 feet, board measure, an average of 1,712 feet to the tree. Ten hundred and seventy-nine of them scaled 1,117,567 feet, an average of 950 feet.

Much merchantable timber had been left in the tops, in several instances as much as 1,000 feet.

The dimensions of four of the largest trees ran as follows:

Stump diameter, in inches.	Top diameter, in inches.	Length of timber, in feet.	Timber marketed, in feet, B. M.	Timber left, in feet, B. M.	Height of tree, in feet.
40	28	70	3,500	500	131
45	35	56	4,050	1,100	120
48	32	36	2,900	1,200	122
40	25	70	3,200	350	126

A study of the annual growth shows something of the history of a tree. One of these, a representative tree, was found to have been cut when 253 years old. During its first fifty years the lateral accretions were minute, as it had a diameter of but eight inches when fifty years old. About the one-hundredth year, however, nearly half an inch a year was added to the diameter. From this time the accretions gradually diminished until the tree was cut.

In marked contrast with the large amount of log-timber left in the tops of trees cut eight years ago, was the clean cutting of last winter on the same land. In this latter cutting, trees having a nine-inch stump and a six-inch top were taken.

Carlton, Minn. *H. B. A.*

Propagation vs. Extermination.

To the Editor of Garden and Forest:

Sir,—We frequently read of the danger of extermination of some of our rare plants by students and amateur botanists, but nowhere do I see any protest against the ravage of our native plants by professional commercial collectors. Every nook and corner of our southern mountains are now searched for floral treasures, and everything that can be sold as a living plant is dug up, and every bough and leaf which has any cash value for decorative purposes is also carried off, while no attempt is made to propagate anything except a few species which it is hard to collect and easy to grow. The so-called nursery-grown plants of many species are many of them simply plants collected and put into the ground just long enough to find a buyer. I have seen plants packed for shipment in such a mutilated state that with the very best care not half of them could possibly live. This is done not only on a small scale, but tens of thousands are taken at once.

Cypripedium spectabile can now be found only in isolated places, and seldom more than a single plant in a place. I have seen but one plant in the woods during the last two years, and that was found by a botanist who has worked here for years, and it was his first specimen; I was told by one of our nurserymen that he had orders for several hundred of them, and yet he never tried to propagate them and he did not know of any one who did. C. acaule is also becoming scarce. I spent considerable time last year trying to find a specimen, but failed. Goodyera pubescens, G. repens, Orchis spectabilis, Habenaria psycodes and H. blephariglottis are a few of our plants that are becoming more rare, and no attempt made at propagation. Pogonia verticillata is a nice little plant with much more beauty than many that are quite popular, but it is so scarce that it has escaped being listed for sale.

I do not wish to discourage the cultivation of our native plants, but I do wish to call attention to the fact that if buyers do not demand a grade of plants which will compel nurserymen to propagate and offer them in better condition, it will not be long before many of our most beautiful ones will be practically exterminated. It might be added that many of our wild plants show a tendency to vary in color of flower, and if these sports were propagated some fine varieties might be procured and established.

Highlands, N. C. *James B. Smith.*

A New Field for Seed and Bulb Growing.

To the Editor of Garden and Forest:

Sir,—In my opinion, California will be as well known, within a few years, for its bulbs and seeds as it now is for its fruits, as a large part of its flowers are Liliaceous, and no state in the union has such a variety of flowers belonging to this family as California. Watson says: "The order (Liliaceæ) forms a marked feature in the flora of California," and the same authority gives 119 species, besides innumerable varieties, as being native to the state. This was in 1880; since then many new species have been found. The heavy adobe soil seems intended for bulb-growing. I think this a promising field for some enterprising person. I have seen Tuberoses that were left in the ground by mistake, and when lifted, at the end of two years, over one dozen large-flowering bulbs were found for every one planted. They had been overgrown with weeds and would have doubtless done much better with proper cultivation; as it was they were as fine a lot as I ever saw. Bermuda Lilies were left out in the same neglected spot and gave like gratifying results. As there were several hundreds of each originally planted, the owner's negligence made a neat little sum. There are some vegetable-seed farms (or ranches) at Santa Clara, and flower-seeds are grown near Ventura. Mr. Lynch, proprietor of the Menlo Park Nurseries, raised, last year—his first season—nearly three tons of Sweet Pea seed. This year he has fifty acres sown to them; forty-seven acres will be devoted to the seed alone. The remainder will be for cut flowers, which are sent as far as Seattle and Salt Lake City.

Waukegan, Ill. *T. D.*

Calanthes at Langwater Gardens.

To the Editor of Garden and Forest:

Sir,—Visitors to North Easton, Massachusetts, will always find some rare and beautiful Orchids in bloom at these gardens, for, although the collection is so large, Mr. Ames was very careful in his selection, so that it contains nothing inferior or commonplace. Among the Calanthes, for example, all the best and most recent introductions can be found here. Not long ago Calanthe Gigas was in bloom here for the first time

in this country, and I was impressed with the noble aspect of the plant as a specimen. It is a cross between C. oculata gigantea and C. Sanderiana, both of which are robust growers, but this plant is evidently stronger than either of its parents. Besides its beauty, the flower of the offspring has especial interest in showing to what extent the characteristics of each parent appear in it. In C. oculata gigantea only the base of the lip or eye is purple, the remainder of the flower being a pure white. On the other hand, the entire flower of C. Sanderiana is rose color, with a lip of deeper shade. The flowers of C. Gigas are large, with a lip of deep rosy-purple, and petals white suffused with purple.

Here, too, I saw Calanthe bella, a lovely hybrid between C. Turneri and C. Veitchii. Its color is an exquisitely delicate rose, with a deeper eye margined with cream-white. The spike arches gracefully, and the flowers are set closely so as to give it a much better effect as a specimen than many others have, especially those which belong to the vestita type. C. Victoria Regina resembles C. bella, but is a shade lighter. C. Sandhurstiana has the general form of C. Veitchii, but is much better in color. Another hybrid, C. Barberi, is an admirable white, much better than either of its parents, C. vestalis or C. oculata.

Wellesley, Mass. *T. D. Hatfield.*

Recent Publications.

Injurious Insects and the Use of Insecticides. A new descriptive manual on noxious insects, with methods for their repression. By Frank W. Sempers. W. Atlee Burpee & Co., Philadelphia. 1894.

The little book under the above title is a useful and handy volume which ought to prove helpful to every practical farmer. There is a great deal of accurate information in it, and while it is by no means complete, we have observed nothing which is actually misleading. The author does not claim to be an entomologist, and as his book is mainly a compilation from authoritative sources, it occasionally shows the little inaccuracies inseparable from works of that description. The first part, devoted to insect classification and insecticides, gives an extremely generalized account of the orders of insects, the composition of the leading insecticides, the formulas for mixing and using, and of some of the nozzles and pumps that should be used. The formulas given are good, and the methods of use are sufficiently accurate. Part II. is devoted to orchard fruits, and the insects most troublesome to each are treated. The fact that the author is not an entomologist appears here and in the subsequent portions of the work, in an apparent lack of familiarity with the literature of the science. Contrary to the statement on page 70, the life-history of the apple-twig borer is completely known. The latest information concerning the pear-leaf mite, page 82, is not included, perhaps because the bulletin containing it had not come to hand. Better methods than those enumerated on page 85 can be used against white grubs, and the pear-midge is not mentioned at all. In Part III., devoted to the insects injuring small fruits, we find a few more serious omissions. The very complete life-history of the strawberry-weevil, and the careful experiments recorded in *Insect Life*, vol. v., are entirely overlooked. Under the Blackberry and Raspberry insects, there is no mention of the red-necked gall-maker, by all odds the most troublesome of the species injurious to these plants, and no account of the crown-borer or of the giant root-borer, which three species are more abundant and injurious in the eastern United States than all the others mentioned in the book. The work done in New Jersey on the Cranberry insects has been overlooked, and the accounts given are quite incomplete.

Part IV. is devoted to insects injurious to vegetables, grains and grasses. Under the cabbage-maggot there is no mention of the hellebore decoction as a remedy, which has proved so successful in several hands, and while kerosene-emulsion is recommended, there is no suggestion as to the proportion in which it should be used. The Cucurbitaceæ are sadly neglected, no mention being made of the melon-louse, which does more injury than all other species combined, while the account of the squash-borer is quite inadequate. Sweet-potato insects are not mentioned at all. The "Boll-worm," p. 154, is treated only as a cotton insect; and while in the middle states its injuries to corn and early tomatoes are serious, nothing is said as to remedies in these cases. On p. 157, in treating of the corn-root louse, no mention is made of the success attending the use of the mineral fertilizers, while the root web-worms are not mentioned at all. In Part V., which treats of insects that infest domestic animals, the account of the "horn fly" is based entirely upon the report of the Kentucky Station, while the full accounts published by the United States Department of Agriculture, and by the New Jersey Station, seem to be overlooked. Without pointing out other errors of omission, those we have noted will suffice to show that this work must not be accepted as containing the latest knowledge even on the subjects which it discusses. As we said at the outset, however, it can be safely followed as far as it goes, and it will prove a useful addition to the practical literature in the libraries of farmers, gardeners and fruit-growers.

The Beautiful Flower-garden is the title of a little paper-covered book issued by Burpee & Co., and written and illustrated by F. Schuyler Mathews. The beginner will not find much definite and detailed instruction in it, but it will exercise a wholesome influence by opening to novices an inviting field where personal study ought to be profitable. Mr. Mathews holds that the best effects of a flower-garden are produced by arranging the various flowers with a view to their harmonies and contrasts of color, and the hints for arrangements which he gives ought to stimulate the reader to try others of his own devising and to endeavor to adjust his plants in accordance with their relative colors and in conformity to some well-considered color-scheme instead of jumbling them together haphazard. Persons who do not quite assent to Mr. Mathew's assumption that color is the all-important element in a garden arrangement, and others who might take exception to the way in which his more elaborate plans are cut up by walks and drives, and even those who could in no way be induced to give any hospitable welcome to such a beast as Mr. Mathews' Chinese dragon, constructed out of lath, cement and Nasturtiums, will find healthful suggestions in his spirited drawings which illustrate how groups of plants can be made effective. The book concludes with some very general, but, as far as they go, sound and practical directions concerning the cultivation of different classes of ornamental plants by Mr. A. H. Fewkes.

All About Sweet Peas is another of Burpee's little manuals, which has been prepared by the Rev. W. T. Hutchins, who knows whereof he speaks, for he has carefully tested the new Eckford varieties, and that he knows how to grow them well is proved by the fact that he carries off prizes wherever his flowers come in competition with others. The book contains a descriptive list of all the varieties and explains how these new kinds are produced, and then it gives elaborate details of the most improved methods of culture by which the largest flowers can be had in abundance and kept in bloom for a long season. Lest the novice should be alarmed by the somewhat voluminous and explicit advice, he can rest assured that the essentials of cultivation are comparatively few. The seed should be sown as early as possible in deep soil, which must be kept cool and moist, so that the roots will have ample space and have abundant food. They are best planted in a trench, say, five inches below the surface, in soil that has been worked deep, and should be covered with about an inch of soil. When the plants are up some three inches the soil should be drawn about them, so as to leave a couple of inches at the top above the surface, and this should be repeated at intervals until the furrow is nearly full. A slight hollow should be left for convenience of watering, for in dry weather it is essential that the plants should have all

the water they can use. A good mulch is a great help, as it keeps the roots cool and prevents evaporation. If all the flowers are cut off every morning, so that no seed forms, the plants will bloom until autumn.

Notes.

Some North River fruit-growers find that Black Caps do best when set between rows of Peach-trees.

An effort is being made by the planters of Ceylon to find an English market for the seeds of the Tea-plant. They contain some thirty-five per cent. of an oil which resembles Olive-oil in appearance and flavor.

A jewel-box, recently presented to Cardinal Gibbons, was made from a piece of the roots of a Mulberry-tree under which, at St. Mary's, in Maryland, it is believed mass was first celebrated in this region. The date of this service was March 25th, 1634, and when the tree blew down a few years ago it was thought to have been between 300 and 400 years old.

The *North-western Lumberman* asserts that, contrary to the belief of most persons, the largest amount of lumber used, even in this country, is not for building purposes. Only about thirty-five per cent. of the total amount is thus employed, while twenty per cent. goes to the making of boxes, and forty per cent. for railroad building, fencing and miscellaneous purposes.

Good pencil-cedar is getting so scarce that the great firm of Faber & Co. have begun to cultivate forests of Cedar (Juniperus Virginiana) in Germany. At Schloss Stein there is a Cedar-forest which covers thirteen acres, and the head of the firm has, for many years, maintained nurseries and plantations of Cedars on his land in Bavaria, grown from seed which he imported from Florida.

The Horticultural College for Women, established in England a few years ago, is reported as steadily prospering. The course it offers covers a period of two years, and each working-day consists of two hours of theoretical instruction, with five of outdoor practice. Pupils are taught to take charge of large estates as well as of gardens, and instruction with regard to poultry-yards is also given.

The University of Cambridge has decided to grant a diploma in agriculture to any candidate who successfully passes an examination in botany, chemistry, physiology, hygiene, entomology, geology, mechanics, engineering, book-keeping and surveying. We have seen a syllabus of the botanical subjects on which the candidate is to be examined, and if the examination in other sciences covers an equally wide field any one who receives the diploma will certainly deserve the title of Master of Agriculture.

The Pineapple, according to the statistics of the last year, ranks far above the banana or the fig, and not much below the lemon, in value as a domestic crop. More than 2,000 acres are devoted to its cultivation in Florida, and the estimates of the new crop from that state are fixed at something like 50,000 crates. The value of the crop last year was something like $900,000, and almost an equal amount was imported from Cuba and the Bahamas. The supply is now continuous throughout the year, while a few years ago it was only known as a fresh fruit in a few seaboard cities during a few months.

Professor Munson, of the Maine Agricultural College, has issued a bulletin on Tomatoes. His experiments show that when plants are handled in pots, before they are set in the field, they are more vigorous and show a marked increase in productiveness over those which are set out in the ordinary way from boxes. It has again been shown that the productiveness of a given variety may be largely increased by crossing with some of the smaller but less valuable sorts, although such a cross-bred sort will quickly run out. Of the new varieties, Burpee's Climax, Maule's Earliest and Brinton's Best are noted among the most promising.

Mushrooms are just now a little higher, but all winter long the wholesale price has been steady at about fifty cents a pound. A great many more are grown in this neighborhood than ever before, and, perhaps, three times as many have been marketed in this city during the past winter as were sold the year before. The wholesale price of hot-house tomatoes has also held steady all winter at about thirty cents a pound, but these, too, have been much more abundant than ever before. Boston cucumbers retail for twenty cents each. String beans grown under glass come in little bunches of fifty pods, which sell for twenty cents. Asparagus is coming from as far north as North Carolina. The cold weather has kept up the prices of all early vegetables from the south, peas, beans and asparagus being most seriously affected.

In a paper recently read before the American Society of Civil Engineers by Mr. James D. Schuyler, it was said that sixteen miles of thirty-inch wooden conduit are used in distributing water in the city of Denver, Colorado, in addition to a considerable amount of forty-four-inch pipe. California redwood was employed, and the cost of the thirty-inch pipe was $1.36 per lineal foot, including the expense of trenching and backfilling. The pipes are composed of staves, smoothly dressed to cylindrical sides and radial edges, and held to a cylindrical form by encircling steel bands. The water under pressure fills the pores of the wood and oozes through to a slight extent, thus ensuring the preservation of the conduits. All the framing of the pipes is done in the trenches; their interior finish is so perfect that the best conditions of flow are secured; and Mr. Schuyler estimated that the use of wood for the purpose had saved the city over one million dollars. The first water-mains employed in New York were of wood, but much more rudely constructed than these. A section of one of them was found, two or three years ago, when excavations were being made in front of the offices of the New York *Sun*.

Two years ago, at the Iowa Experiment Station, the crossing of Rosa rugosa with other varieties of cultivated Róses was begun on a considerable scale, and something like 20,000 seeds were obtained from Rosa rugosa fertilized with pollen taken mainly from Hybrid Perpetual and Tea Roses. The pistillate parents are Russian types of Rosa rugosa, which vary considerably from those introduced from Japan and China, the Russian forms being hardier in the north, somewhat more graceful in habit, and earlier to flower. Some of the hybrids showed bloom last year, a few of them before they were four months old, and all of the flowers showed an increase from the five petals of Rosa rugosa. It was hoped that some new Roses might be secured for the prairies of the north-west, where the ordinary garden varieties only survive when carefully protected during the winter. But, so far, the experiment seems to show that the hybrids resemble the male parents in cultivation, although they flower at an earlier age, and they give no special promise of superior hardiness or freedom from mildew. It seems probable, however, that out of many varieties a few may be secured which inherit the hardiness of the mother plant, with leaves resembling those of Rosa rugosa, and flowers with something of the fragrance of the Teas and the special beauty of the Hybrid Perpetuals.

There are no California oranges in this market now, and there have been no good ones here this year. As a reason for this scarcity it has been urged that western cities have taken the entire supply, so that none of it has reached this market; but the fact seems now to be demonstrated that California oranges are not up to their usual standard this year. It may be that the freeze in the early part of January, while it did not injure the fruit, so checked the vigor of the trees that they were not able to ripen it properly. At all events, California oranges seem to be unusually light and juiceless. This lack of competition with California fruit has kept the price of late Florida oranges high, and many of them have been put in cold storage for later demand. It is also said that western cities which have been disappointed in the quality of the California fruit are now also looking to Florida for late supplies. Good Florida oranges now command $4 00 a box. Grape-fruit brings a dollar to two dollars a dozen. For some years the demand for this fruit has steadily grown and has always been greater than the supply, so that the price has ruled twenty-five per cent. above that of oranges. There is a growing belief in the medicinal value of this fruit, and those who acquire a taste for it prefer it to oranges. To many persons it has become indispensable at breakfast, and it is also cut up and served at later meals after standing some hours in sugar. A Florida paper says that a grove of Grape-fruit has become a profitable possession, since fifty of the fruits fill a box, which brings more than a box of oranges holding from a hundred and twenty-six to two hundred. Catawba grapes of excellent quality can still be had at twenty-five cents for a five-pound basket. The only pears on sale are Winter Nelis, which command a dollar and a half a dozen. These pears have kept unusually well this year, while Easter Beurre decayed more rapidly than usual. Strawberries are comparatively scarce, owing to the cold weather in the south, but beautiful ones can be had from Florida at forty five cents a quart. "Crystallized figs" from California, in limited supply, readily bring fifty cents for a pound and half box.